



EXAMINING FIDELITY OF STATE STANDARDS IN PROJECT-BASED LEARNING UNITS

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ABSTRACT

The problem investigated was the decline in student achievement since the implementation of project-based learning (PBL) by the third- through sixth-grade teachers at the local elementary school. The purpose of this basic qualitative study was to investigate teachers' perceptions of their knowledge of PBL and its application in third- through sixth-grade classes at the study location. The study was rooted in Jean Piaget's cognitive learning theory of constructivism. The study location was an urban school district in the Southern United States. Data on teacher perceptions were gathered through structured interviews, conducted via Zoom, with eight elementary teachers in third to sixth grade. Inductive coding, code landscaping, and code mapping were used to generate five themes based on participating teachers' experience with PBL. Results indicated that experienced teachers were able to speak specifically to their instructional practices and beliefs, while inexperienced teachers felt they were unable to adequately provide information. One commonality was that all participants said they needed a strong formal training and ongoing support structure to ensure effective instructional fidelity of state standards in PBL units. A 3-day professional development was developed to support teachers in planning and implementing project-based learning to ensure instructional fidelity of state standards throughout their units. This study could create positive social change by assisting administrators with supporting teachers with planning effective PBL units.

KEYWORDS: Problem-based learning, student-centered, elementary school education, student achievement, fidelity problem-based learning implementation.

INTRODUCTION:

The problem investigated in this study was the decline in student achievement since the implementation of project-based learning (PBL) by the third- through sixth- grade teachers at the local elementary school. The decline in student achievement prompts concerns regarding the fidelity of PBL instruction to the state standards. Cavendish et al. (2017)¹ suggested that accountability and ratings have increased the emphasis on testing, which has shifted the focus from art and enrichment to test-taking strategies. In 2016, third- to sixth-grade teachers at the school incorporated PBL to balance the requirements of testing and student experiences. PBL was included in the curriculum because studies have shown that this form of learning results in improved student achievement, career readiness, and life skills².

Although studies show that PBL increases student achievement, school ratings have decreased over the last 3 years at the local school, according to the network director. During the 2014-2015 school year, before the implementation of the PBL requirement, the campus met state standards and received distinctions in four areas³. The area of student achievement received a score of 80 out of 100, resulting in a school rating of "B." In 2018-2019, the school met the standard, but received no distinctions, and only received a student achievement score of 64 out of 100, resulting in a school rating of "D."

The school for this research study follows an innovative school model, allowing it to receive additional funding. If the school rating does not reflect success, the model could be removed, as well as the additional funding, according to the network director. School rating systems provide information to the public, allowing them to make decisions about enrollment and neighborhood selections⁴. If the school is perceived to be underperforming, enrollment will likely continue to decrease.

There are numerous instructional processes a teacher must effectively engage in to ensure student success during PBL. Currently, teachers at the school have autonomy in regard to how they plan, implement, and assess PBL units, and there is little accountability of student mastery, the network director noted. A few instructional processes that lead to student success are intentional planning of required state standards; activity fidelity, which refers to the extent that activities are being carried out as planned; and continuous assessment of learning⁴. Throughout the intentional planning of the PBL, the learning standards must be at the forefront of planning and implementation. Price et al.⁵ observed that teachers must begin planning by looking at the required standards, then design a driving question that will engage students.

When considering activity dependability, a breakdown in planning and execution could result in students missing important information or having misconceptions that go unaddressed. According to Spaulding⁶, the determining activity is not meant to decide if students have met objectives but to clarify if the information has been presented in an accurate sequence. Last, elementary school students require high-quality teaching practices to support academic performance⁷. High-quality teaching is necessary to reach mastery of standards as well as

inform instructional decisions that support individual learning. Although studies show that PBL has positive implications for student achievement over traditional instruction⁸, the campus is showing a decrease in student achievement on state standardized testing, providing support for the need to understand instructional fidelity of state standards during PBL units. The following research questions (RQs) were used to address the qualitative case study:

RQ1: How do teachers perceive the instructional fidelity of state standards in third- to sixth grade during project-based learning?

RQ2: How do teachers indicate that their training and support impacts their instructional fidelity of state standards in third- to sixth-grade project-based learning units?

RQ3: How do teachers indicate that the instructional fidelity of state standards is reflected in their instructional practices?

MATERIALS AND METHODS:

In this qualitative case study, local problem of a decline in student achievement since the implementation of PBL by third- through sixth-grade teachers at the local elementary school were investigated. The qualitative case study approach was appropriate because the goal of the research was to understand individuals in a specific setting and understand the meaning behind the events that are occurring. The case study method was appropriate for this study because numerous sources of data provide evidence related to a real-life situation and help to explain a problem or behavior⁹. To assess the instructional fidelity during PBL units, participants were interviewed about their planning, implementation, and assessment processes. Interviews provided information on participants' perceptions of incorporation of standards into PBL units. Teachers may have high-quality resources and lesson plans, but if they result in poor implementation, student achievement may be impacted¹⁰. The focus of this study was on grade levels that engaged in state testing, as their achievement determined the state rating. The school site selected for this research study was an elementary campus serving around 400 students in prekindergarten through Grade 6 in an urban district in the southern United States. The neighborhood consisted of generational homes from diverse demographic backgrounds. Campus leadership applied to become an in-district charter school 4 years ago, which allowed more nontraditional methods of teaching and flexible funding sources. Campus leaders included PBL in the charter document to support authentic student experiences while participating in civic engagement. School leaders also established 30 additional school minutes to each school day to incorporate a social-emotional learning block. The school operated on a year-round calendar, allowing more breaks during the school year to reduce burn out, as well as reducing the amount of time off in the summer to reduce the impact on student achievement of not being in school. Enrollment allows students who live in the neighborhood automatic attendance, but students from all over the district can apply and are accepted into the school through a lottery of open seats after the neighborhood students have enrolled.

Interviews were conducted with each of the eight teachers to gain information on the level of training and ongoing support and teacher perceptions of integrating required standards into project-based learning units. These interviews provided information on how teachers are integrating required standards into their project-based learning units. These interviews followed an interview protocol. The alignment of the interview questions with the RQs can be found in Table 1. By analyzing the responses to these questions, teachers provided insight into their perception of instructional fidelity of state standards during project-based learning units. To ensure accurate information was gathered, all interviews were audio recorded and transcribed.

Table 1

Alignment of Interview Questions to Research Questions	
Interview Questions	Research Question
I. How long have you been engaging in project-based learning?	RQ2: How do teachers indicate their training and support impacts their instructional fidelity of state standards in third to sixth grade project-based learning units?
II. What training have you received in project-based learning? Please provide specific organizations if possible.	RQ2: How do teachers indicate their training and support impacts their instructional fidelity of state standards in third to sixth grade project-based learning units?
III. Beyond your initial training, what supports have you received during the planning or implementation of PBL?	RQ2: How do teachers indicate their training and support impacts their instructional fidelity of state standards in third to sixth grade project-based learning units?
IV. Describe your process for planning a PBL unit.	RQ3: How do teachers indicate the instructional fidelity of state standards is reflected in their instructional practices?
V. Describe the methods you use to teach and assess standards during project-based learning units.	RQ3: How do teachers indicate the instructional fidelity of state standards is reflected in their instructional practices?
VI. What are your beliefs surrounding state standard during project-based learning?	RQ1: How do teachers perceive the instructional fidelity of state standards in third to sixth grade during project-based learning?
VII. In what ways do standards inform your PBL unit?	RQ3: How do teachers indicate the instructional fidelity of state standards is reflected in their instructional practices?
VIII. What are some ways you address the state standards during project-based learning?	RQ3: How do teachers indicate the instructional fidelity of state standards is reflected in their instructional practices?

RESULTS:

After analysis of the interviews through open coding, code landscaping, and code mapping, the data went through a second round of coding utilizing MAXQDA to confirm the initial findings. Through this data analysis process, five total themes emerged in relation to the RQs. Information gathered regarding RQs 1 and 3 were divided in responses based on teacher experience, resulting in two themes for these questions. Teachers inexperienced in PBL felt they did not have the: training, knowledge, capacity, or time to effectively implement instructional fidelity of state standards. Experienced teachers had a strong belief in project-based learning being grounded in the state standards, and that utilizing best instructional practices throughout PBL units to ensure mastery of standards. All teachers felt a formal initial training and strong ongoing support from experienced teachers and coaches was essential and would improve the instructional fidelity of state standards during project-based learning units in grades three to six.

RQ1: How Do Teachers Perceive the Instructional Fidelity of State Standards in Third to Sixth Grade During Project-Based Learning?

Theme 1: Experienced PBL Teachers Believe Standards Are Essential and Drive the Planning and Implementation of PBL. Of the eight teachers who were interviewed, three had more than 2 years of experience. Each of these teachers spoke directly to grounding the project-based learning units in standards. Interviewee 2 stated, "They're the core of the PBL. I don't understand how you could do a PBL without them. They're basically your framework. They're like the

frame of the house. We build the PBL around that and it just makes teaching so much easier." Interviewee 3 mirrored this belief, "I think the PBL has to be anchored to your standards and you have to be very dedicated to them and not let the project drive. So, you have to continuously come back to see if you're actually assessing the standard itself and the depth of it." Each of these interviewees had more than six years of experience incorporating PBL into their instruction. Although Interviewee 1 had a few years less experience (three years), they also stated, "So, for me, the standards come first. What we are supposed to be teaching this year and how can we incorporate that into a PBL verse here's a PLB, how can I make the standards fit?" While each of these teachers were able to articulate the importance of the standards when asked their perception, they also were able to speak more technically about the implementation of standards within instructional practices during project-based learning, which will be discussed in later themes.

Theme 2: Inexperienced PBL Teachers Lacked Experience to Implement Instructional Fidelity of State Standards During PBL Effectively. Five out of the eight participants stated they had under three years of experience with project-based learning. Inexperienced interviewees stated that although they believe they should be a driving force, but they lacked the time to plan and execute well, which they did not currently have the capacity to do. Interviewee 7 felt that to incorporate standards effectively the units had to be interdisciplinary. "This is the first time in ten years I have taught elementary, so I think there's just a lack of experience doing that. If I were to do it, I would need a lot more help and guidance. I would rather just stick to what I know and do each content separately well, than try to do this combination of a big project." Participants also shared that they felt project-based learning should be grounded in their standards. Interviewee 5 felt that standards were essential to project-based learning, but currently that was not occurring, from her perception throughout the campus, and she had been sticking to PBL for social-emotional learning only to ensure that standards were covered extensively since there has been a decline in the school's state rating. Other participants, who were in their first year of PBL implementation, were unsure how to effectively incorporate them into their instruction. For example, interviewee 8 stated, "I'm interested in learning how we could do that, because I don't want one to feel higher than the other." This idea of being worried about ensuring the standards were covered continued with, "I'm worried that if I give to PBL only, then I lose my students' academic part, which is concerning to me." When asked what the root cause of this sentiment was, the interviewee replied, "I don't have the training for it, so I don't know how it's been incorporated. I would rather give to my students the academic part and not take away from it, so it's difficult for me."

Being that project-based learning was incorporated into the charter as an essential and required piece of the campus instruction, teachers who have been at the campus less than two years felt hesitant when discussing their personal beliefs about state standards being incorporated into project-based learning. They felt that this was due to their lack of experience and support in planning and implementation. Each of the interviewees felt that they could see how the standards being incorporated would be beneficial and possible, but did not personally know how to do this effectively, without student academics suffering.

RQ2: How Do Teachers Indicate That Their Training and Support Impacts Their Instructional Fidelity of State Standards in Third- to Sixth-Grade Project-Based Learning Units?

Theme 3: Teachers Require Formal Training and Ongoing Support Instructional Fidelity of State Standards During PBL. All teachers in the study felt that strong initial training, and ongoing support was necessary to be successful to ensure instructional fidelity of state standards during project-based learning units. When comparing interview responses, each of the interviewees that had formal training from an outside agency, or an extended training at the campus level, spoke more technical about their process for planning, implementing, and assessing a PBL unit. Interviewees were each asked about their process for planning a PBL unit. Teachers with PBL training each articulated a process that included standards, essential questions, a launch, and instructional activities. For example, interviewee 3 shared her process, "I plan with the standards in mind. I'll develop a driving question, which is generally pretty broad. We'll do some type of entry activity to engage the students. We then go into the knowledge component, inquiry process with the students." On the other hand, teachers who had little to no training stated, "From what I've gathered, we come up with a question that drives it. We just explore that question, I guess; I don't know that I have a process." Two other interviewees referenced an outline template, or planning document, that they had been provided with that they work through to plan, and then implement what they had provided on the document.

Although teachers felt this document was useful, they still felt they needed a stronger support system in planning and implementation. All eight interviewees mentioned campus level support in the form of an instructional coach. Six of the eight interviewees stated that they received campus level support in the form of suggestive feedback. Three of the eight interviewees indicated that they received support in the form of collaboration for brainstorming and access to community resources. Teachers felt that the feedback was helpful, but at times it was not timely enough to be supportive. Interviewee 6 stated, "It seems like I get a little bit of feedback; there's not really a process for it." Interviewee 4 added, "I think

typically it looks like encouraging feedback, and maybe picking little areas that I can change or adapt to best fit my class or my setting. But a lot of just constructive feedback.”

At the end of each interview, participants had the opportunity to share any additional thoughts they wanted to contribute to the study in relation to the instructional fidelity of state standards during project-based learning. 100% of the teachers provided their thoughts on the need for more formal initial training, ongoing support structures, and the ability to collaborate with their team, as well as teachers with experience in PBL to be effective in their instructional fidelity of state standards during project-based learning. All teachers shared a positive perception that project-based learning was an effective teaching practice for students, but six of the eight participants did not feel they had the amount of formal training or ongoing support to implement instructional fidelity of state standards effectively to ensure student achievement increased.

RQ3: How Do Teachers Indicate That the Instructional Fidelity of State Standards Is Reflected in Their Instructional Practices?

Theme 4: Experienced PBL Teachers Utilized a Variety of Teaching Practices Within PBL to Support Instructional Fidelity of State Standards.

Teachers were asked about the ways they teach and assess standards during project-based learning units. Answers continued to provide insight into the amount of training teachers had received based on the depth and complexity of their responses. Each of the three experienced teachers spoke about starting their planning process with the standards, backwards planning, and ensuring all activities connected back to the end result, which was mastery of the standards. Interviewee 2 discussed the planning process began with looking at the TEKS to be covered for the year, utilizing a backwards planning process, determining where did TEKS connect across contents, and aligning these first. Assessment and activities followed, but ensuring spiral of the TEKS continued throughout the unit.

Experienced teachers were able to speak to specific instructional practices they incorporated into their project-based learning units. Interviewee 3 spoke at great length about the different aspects of instructional practices that are incorporated into their PBLs, which included checklists for soft skills, self-assessments, pre-and post assessments, formative assessments, rubrics, small group lessons, mini-lessons, and direct teach instruction. Interviewee 1 included thoughts about incorporating the TEKS and how it related to STAAR by using check for understandings, mini-lessons, as well as student inquiry. All three experienced teachers felt that it was essential to incorporate mini-lessons, with some form of assessment to ensure instructional fidelity of the standards during their project-based learning unit. These teachers (all three) also discussed the importance of spiraling skills until students mastered them, and providing scaffolding supports for struggling students to aid them in reaching mastery of the required standards. All three experienced PBL teachers also emphasized the importance of developing PBL units that were interdisciplinary to ensure that they could cover as many standards as possible within the PBL. Interviewee 1 discussed a PBL around the reading standards for folk tales around the world, depending their understanding of other cultures. They were able to incorporate social studies, reading, comprehension, and research standards. Other interviewees discussed finding of articles that related to the PBL to incorporate reading standards which lead into the inquiry based activity. The inquiry-based activity would incorporate assessment, most often around a science or social studies standard. Lastly, interviewee 3 added to be effective and master standards they have incorporated writing, science and reading so the learning is not in isolation, which has led the students to a higher level of mastery due to ongoing spiral of standards for an extended period of time. It was also noted that the standards provide action steps for the teacher by utilizing assessments to determine what students need scaffolded supports, and what areas need to continue to be spiraled throughout the PBL.

Each of the experienced PBL teachers spoke in detail about their instructional practices during project-based learning to incorporate instructional fidelity of state standards throughout the unit. Many of these practices are best practices for instruction, even outside of PBL, but the teachers had incorporated them into the unit to ensure academic success of their students. They felt that integrating best practices into PBL had allowed them to ensure student mastery of the required standards. Throughout the interview teachers also continuously mentioned an emphasis on the standards throughout the planning and implementation of project-based learning units.

Theme 5: Inexperienced PBL Teachers Lacked Knowledge of Standards and Required Training to Incorporate Instructional Fidelity of State Standards During PBL Units.

Teachers with limited experience were able to provide some insight into their instructional practices that supported instructional fidelity of state standards during project-based learning units. Interviewee 4 discussed incorporating mini-lessons in support of student inquiry. They also stated that state standards are addressed through assessments. The participant later stated that formal training was lacking, the ideas that were shared were gained from interactions with other teachers, but felt that they were unsure how to incorporate the standards into PBL properly to ensure instructional fidelity. Although the participant was able to speak to the instructional practices, they had yet to execute these ideas.

Inexperienced teachers found questions relating to their instructional practices in regard to instructional fidelity of state standards during project-based learning more difficult to respond to. Four of the eight participants stated that they had only incorporated PBL into social-emotional lessons. “I hadn’t considered it previously (when asked about how standards inform PBL). I just assumed that PBL went along with SEL, but looking at it now I can see there might be some sort of an alignment there,” stated Interviewee 6. When asked how this participant would address standards during PBL they stated, “I guess I don’t have an answer for that question.”

Another participant had shared that they attempted a PBL previously in the year but ended up not continuing. When asked about how they would incorporate instructional fidelity of state standards into their instructional practices, they replied, “I think in order for myself as a first timer doing it, I think I would have to do it separate just to be able to do a good PBL. They should have to be separate in the beginning, at least for a first timer just so that I can see how it’s going to work without worrying about taking away from teaching the students.” Interviewee 5 replied, “In terms of where I think my priorities are, I don’t think I have the bandwidth in order to do that well, from what I know....” These statements indicated that the teacher did not have training or guidance on how to effectively incorporate standards into PBL. Although all five inexperienced teachers felt that they should be incorporated into instructional practices, they lacked the training and support to ensure that they were able to incorporate the standards into their practices effectively to ensure student achievement, which has discouraged them from attempting to following through on engaging in project-based learning in the way it was intended.

DISCUSSION:

The purpose of this qualitative study was to investigate the decline in student achievement since the implementation of PBL at the study location. To do so, third- through sixth-grade teachers’ perceptions of instructional fidelity of state standards during PBL were explored. Findings from the study indicate that teachers required: capacity, collaboration, support, planning, training, appropriate timing, and knowledge of the depth of the standards to ensure instructional fidelity of state standards during PBL units.

Instructional fidelity of state standards during PBL units in Grades 3 to 6 were examined. Due to a decline in student achievement at the study site, the study was addressed. After analyzing the data collected from interviews with the participating teachers, it was concluded that formal training was necessary to ensure effective implementation of instructional fidelity of state standards during PBL units. In response to the results of this study, a 3-day professional development was created to provide support for the study location. The professional development will address each of the topics that participants identified as necessary to incorporate instructional fidelity of state standards into their PBL units. These needs included: training, support, collaboration, planning, time, capacity, and knowledge of their grade-level standards. The professional development was developed to provide the skills and knowledge surrounding instructional fidelity of state standards to support teachers in their planning and implementation of PBL units. The structure of the professional development also provides time for teachers to plan and work together, fostering a supportive and collaborative environment that is intended to carry into the school year. When teachers work together, they are provided with the ability to engage in continuous improvement that has a beneficial impact on student achievement¹¹. The professional development was designed to provide teachers with the skills and knowledge they need to effectively implement instructional fidelity of state standards during PBL, while also fostering a collaborative environment for ongoing support. The professional development sessions were designed using research-based practices for adult learning.

Although a strong professional development has been developed for the study location to provide the skills and knowledge for effective planning and instructional practices surrounding state standards during PBL, there could still be flaws on the implementation of instructional fidelity of state standards during PBL units. One of the most important factors impacting effective implementation of instructional practices is a positive classroom culture¹². This factor could hinder the effectiveness of the implementation of instructional practices in PBL due to the high degree of collaboration and teacher facilitation, rather than direct teaching methods, required within the classroom. Campus administration are the driving force for creating a positive school culture and offering structural supports for effective teaching to ensure learner outcomes¹³. Without a strong classroom culture, instructional fidelity of state standards during PBL could suffer. This professional development does not address classroom culture or culture building at the campus.

CONCLUSIONS:

The purpose of this qualitative study was to investigate the decline in student achievement since the implementation of project-based learning (PBL) by exploring teacher perception of instructional fidelity of state standards during project-based learning in third- through sixth-grade teachers at the study location. The problem was investigated to determine teacher perception of instructional fidelity of state standards in project-based learning units, to determine a potential solution to the problem. Teachers provided insight into the reasons they were unable to effectively implement instructional fidelity of state standards into

PBL units. These reasons included a lack of training, planning, support, collaboration, capacity, and knowledge of their grade level standards. Teachers felt that a formal training would provide many of the skills and knowledge they needed to be more successful in the PBL program. These results drove the creation of a professional development that aimed at the following goals:

- Goal 1: Teachers will gain a deep understanding of the project-based learning teaching practice, as well as the core components and benefits.
- Goal 2: Teachers will backwards plan (starting with the state standards) to develop interdisciplinary PBL units.
- Goal 3: Teachers will begin to develop collaborative relationships that can support them throughout the PBL implementation process.
- Goal 4: Teachers will understand a variety of instructional practices that can be utilized to deliver state standards during PBL units.
- Goal 5: Teachers will engage in feedback protocols to improve instructional fidelity of state standards in project-based learning units during the planning process.

The professional development provides comprehensive initial training and begins to establish collaborative structures that will continue within the campus. Although a strong training is provided, the administration and instructional coach must continue to provide a space for these collaborative structures. This will require an ongoing support plan to be created to support teachers during the implementation process of the PBL.

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